There are five times as many DNA paternity tests per capita in the US than Australia. This is not a consequence of ‘technological lag’, but a combination of political, cultural and economic factors. First, government agencies in the US enforce relatively more tests, at least partly because of legislative differences in the presumption of paternity. Second, government agencies in the US enforce relatively more tests partly on account of differences in family structure. More specifically, in the US there are relatively more nonmarital births, and nonmarital births are less likely to occur in the context of informal cohabitation where paternity is not in dispute. Third, differences in industry organisation account for more DNA paternity tests per capita in the US. Unlike the Australian market, the US market is characteristically divided between tests done for government agencies and those for private individuals. In turn, the private market in the US is more competitive. In particular, brokerage is pervasive, leading to more proactive marketing through the Internet, day-time television and other avenues. The study highlights the importance of social dynamics in the uptake of new technologies.

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This article explores why there are so many more DNA paternity tests per head of population in the US than in Australia. First, it addresses theoretical and methodological issues: that is, the literature on the social implications of genetic testing, and the approach and methods employed in this study. The article then explores four possible explanations for differences in the scale of paternity testing in the US and Australia. The first of these explanations turns upon the influence of technology; the second considers the influence of government policy; the third addresses family structure; and the fourth examines the influence of industry structure and markets.

Social implications of biotechnology

There is now an extensive literature on the social implications of biotechnology. It addresses the implications for our understanding of genetics.
and behaviour, antenatal screening and testing, genetic testing, genetic engineering, genetically modified foods and cloning (e.g. Willis 1998; Pilnick 2002; Fukuyama 2002; Bauer and Gaskell 2002; Agar 2004; Hindmarsh and Lawrence 2004). This literature is highly speculative. It mostly addresses what might happen rather than what has happened. This is reasonable. Biotechnology, not with standing the hype, remains an industry with relatively few products. Yet the products that it promises have extraordinary scope to change our lives. Thus the US political scientist Francis Fukuyama has renounced the ‘end of history’ - the unfolding of a ‘progressive universal history’ culminating in the triumph of liberal democracy - on account of the ‘biotechnology revolution’ that threatens to ‘alter human nature and thereby move us into a “posthuman” stage of history’ (2002:2,7).

Moreover, biotechnology already has a record of arriving at unanticipated outcomes, catching politicians and the public by surprise. In the early 1980s the biologists Davor Solter and James McGrath conducted exhaustive experiments whereby they attempted to clone mice. They failed repeatedly. On this basis they concluded that ‘the cloning of mammals, by simple [somatic cell] nuclear transfer, is biologically impossible’ (cited in Agar 2004:33). Dolly the Sheep was born twelve years later. Her birth precipitated a ‘moral panic’, including instant policy responses from the Pope, the US President, the British government and the European Commission (Torgersen et al 2002:65). As the philosopher Nicholas Agar has observed: ‘It is better to have principles covering situations that turn out to be impossible than to have no principles for situations in which we suddenly find ourselves’ (2004:34).

Paternity testing is a relatively long-standing application of biotechnology. Since its invention in 1984, it has become an industry in its own right around the world; it has been institutionalised through government agencies and family law; and it has been seized upon by the media, including daytime television talk shows where couples confront each other and test results are disclosed in front of a live audience. On this account it provides scope for comparative analysis based upon what has actually happened. More specifically, it is possible to explore the influence of cultural context in the uptake of biotechnology. This may provide some guidance in understanding the influence of cultural context in relation to other biotechnology applications, especially those that involve genetic testing.

The current study

The discovery of blood groups and the refinement of serological research in the course of the twentieth century created the scope for science-based paternity testing. Yet the results were often inconclusive. The invention of DNA identity testing in the early 1980s made it possible to attribute biological paternity with much more certainty. A DNA paternity test can prove with complete certainty that a man is not a child’s biological father. It cannot prove that a man is a child’s biological father with 100 percent certainty, but it can guarantee at least a 99.9 percent probability of paternity (Borém et al 2003:127; Friedman 1999:177).

The invention of the Polymerase Chain Reaction (PCR) technique in the late 1980s – whereby a single cell of DNA can be reproduced in large amounts - made the tests faster and cheaper, facilitating the rapid expansion of a commercial DNA paternity testing industry. In turn, government agencies – such as the Office of Child Support Enforcement in the US and the Child Support Agency in Australia - increasingly demanded DNA paternity testing in the context of disputed paternity and claims for social support. More than this: media coverage fuelled consumer demand for the tests, especially among men with reason to doubt whether they were the fathers of their putative offspring. In 2003 there were more than 40 laboratories in the US (overwhelmingly private), doing more than 350,000 paternity cases per annum (AABB 2004:2). In Australia there were 7 laboratories (6 of them private), carrying out tests for an estimated four to five thousand cases per annum (Gilding 2004:70).

This article calls upon two types of evidence. First, it draws upon what is on the public record.
In particular, it uses the published results of an annual survey of US laboratories by the American Association of Blood Banks (AABB); a government-commissioned inquiry conducted by the Australian Law Reform Commission (ALRC) and the Australian Health Ethics Committee (AHEC) of the National Health and Medical Research Council; legislation and policy documents concerning the acknowledgement of paternity and child support; and the large body of media-generated coverage of the industry in both the US and Australia. These sources are indispensable, but very limited. The annual AABB survey in the US, for example, provides rudimentary data only. Even then, its data is far superior to what is available on the Australian industry.

Second, the article draws upon interviews with key informants in the industry, conducted in 2004. In the US I interviewed 17 informants in 7 states (California, Texas, Ohio, Indiana, Utah, New Mexico and Nevada). Of the 17 informants, 13 were middle and senior management from 9 laboratories; the balance were management from a sample collection agency (for another laboratory), a major supplier (of test kits), a major buyer (the Child Support Enforcement Division), and a company that had conducted a feasibility plan for entering the market. In Australia I interviewed 17 informants from 5 states (New South Wales, Victoria, Queensland, Western Australia and South Australia). Of the 17 informants, 8 were middle and senior management from 7 laboratories; 4 were major buyers (senior officials from state Legal Aid agencies); 3 were one-time managers who were active in the formation of the industry; one was middle management from a US-based industry supplier (of test kits); and one was a representative from the National Association of Testing Authorities (NATA), the main regulatory authority.

The interviews were a rich source of data, providing insights that were simply not possible through the public record. In particular, interviewees provided some indication of their client base, unavailable through public records. At the same time, the interviews were difficult to conduct. This is in the nature of any research that addresses real-life markets. On first approach many informants were suspicious of my motives, fearing that I might represent a competitor. Most informants from laboratories declined to answer questions regarding the scale of their business and future business strategy. All but a few insisted upon anonymity on account of commercial considerations. Even so, only three informants refused to allow recording and transcription of the interviews. For these interviews I took notes. Most informants talked with me for between 60 to 90 minutes, reflecting carefully on the questions and elaborating on their replies. Those informants with laboratories usually provided a guided tour of the premises also.

The public record and interviews combined make it possible to compare the dynamics of paternity testing in the US and Australia. Even so, the lack of detailed information about the client base in both countries means that this discussion is necessarily tentative.

**Technology**

Perhaps the most obvious hypothesis to explain the difference in the scale of DNA paternity testing between the US and Australia is that the technology originated in large measure in the US. (The other major player was the UK.) Following this logic, commercialisation followed invention, and it is just a matter of time before Australians ‘catch up’, in the same way as they have ‘caught up’ with other US innovations such as McDonalds and cable TV. Presumably this means that in a decade or so there will be 25,000 paternity tests per annum in Australia, commensurate with the current US rate. This explanation has a logic grounded in what is often described as technological determinism; that is, the view that technology ultimately drives social and cultural change (MacKenzie and Wajcman 1999:3-6).

This explanation does not withstand closer scrutiny. The uptake of DNA paternity testing in the US was relatively slow. In 1991, seven years after the invention of the new technology, the overwhelming majority of paternity tests in the US (86 percent) involved established (non-DNA)
serological techniques (AABB 1992:1). Thereafter, the rapid uptake of the PCR technique meant that DNA-based techniques rapidly gained ground. In 1994 the number of DNA tests overtook the number of red cell marker tests – the main serological technique employed. The following year the number of all DNA tests outnumbered all serological tests (AABB 1997:4). By 1998 only 7.8 percent of tests included serological testing, and only 2.6 percent involved serological tests alone (AABB 1999:4).

There is no equivalent survey-based data for Australia. One respondent described, however, the process through which he established the first dedicated laboratory for DNA testing in Australia in 1989, armed with an untested Australian patent licensed from a US biotechnology company. He elaborated:

[The new business] had done some market research, which again with the wonderful benefit of 20/20 hindsight was not particularly good. They estimated that there was about 10,000 paternity cases a year in Australia ... I was never able to work out what their basis for that was. I think a far more accurate figure was maybe two to three thousand. And they also figured that because of this ‘gee whiz’ technology they’d get the full market. So 10,000 cases a year at $1,000 a case, you’ve got yourself a nice little business. They never got more than about 200 cases a year, mainly because: (a) there weren’t that many to get, and; (b) because I don’t think they were aware that the legal market – which is basically what we were targeting – is far more conservative than the scientific sort of market. They [the legal market] would much rather stick with tried and true technology that wasn’t as ‘gee whiz’, rather than stake their clients or their case on untried technology (Former lab manager, Australia).

Like the US, the dominant provider in the Australian market at this point did (non-DNA) serological testing. Notwithstanding the conservatism of lawyers, in 1992 another new company pioneered the PCR technique in the Australian context. By 1993 all of the major Australian providers had followed suit. Entrants into the market also employed the PCR technique. In other words, in 1993 the proportion of paternity tests that used DNA techniques was possibly greater in Australia than in the US. Thereafter DNA techniques predominated in both countries. Even so, the number of tests in the two countries per capita varied substantially. By implication, technology does not provide an explanation for differences in the extent of DNA paternity testing between the two countries.

**Government**

Another hypothesis to explain the difference in the scale of DNA paternity testing between the US and Australia is that US governments are more likely to enforce the tests. After all, governments are the biggest buyers of the tests in both countries. Government agencies in both the US and Australia demand compulsory DNA paternity testing as a way of making biological fathers pay for their children, rather than the taxpayer. They do so in the context of rising divorce and nonmarital birth rates, skewed towards lower-income men and women with less capacity for child support (Khoo and McDonald 1988:164; Silvey and Birrell 2004:46; Coltrane and Collins 2001:508-9). Perhaps differences in the way in which government agencies apply this policy explain differences in the overall levels of testing between the two countries.

Consider the US first. Here the informants consistently distinguished between two distinct markets in the paternity testing industry; one for government agencies, notably the Office of Child Support Enforcement (OCSE), and the other for what is called ‘private testing’ by individual clients. There are no public figures on the relative scale of these markets, but certainly state-based Child Support Enforcement (CSE) agencies are the biggest single clients for the tests. This market is organised through government tenders and is dominated by two companies: LabCorp, a subsidiary of the pharmaceutical giant Roche, and Orchid GeneScreen, the recent product of many mergers and takeovers. The tests conducted through this market are fundamentally an
instrument of government welfare policy, paid for largely by the federal government and administered by the states. They are designed to ensure that biological fathers support their children. This is consistent with welfare reform in the mid 1990s dedicated to ‘making men into dads’, through child support and paternity establishment legislation (Curran and Abrams 2000:662; Hany and March 2003). The OCSE Handbook explains:

The Child Support Enforcement (CSE) Program is a Federal/State/local partnership to collect child support. We want to send the strongest possible message that parents cannot walk away from their children. Our goals are to ensure that children have the financial support of both their parents, to foster responsible behavior towards children, and to reduce welfare costs (OCSE 2005:i).

More specifically, regional CSE agencies locate non-custodial parents, establish paternity, establish and enforce support orders and distribute money collected (OCSE 2005). They are able to order DNA paternity tests without a court order, albeit only if there is a court application for the establishment of paternity and/or support pending (OCSE 2005; NCDHHS no date). An application for child support with CSE agencies is a condition of eligibility for government welfare support (the Temporary Assistance for Needy Families program); although since the mid 1990s such support is available for no longer than five years. CSE agencies pay the upfront costs of the tests, but 90 percent of these costs are reimbursed by the Federal government, provided the test was conducted by ‘a state selected testing laboratory’. If the claim against the alleged father is proven, then the father is required to repay the cost of the tests to the government (OCSE 2005; NCDHHS no date).

Interviews with CSE officials in New Mexico, a southern state with a population of 1.8 million, provide some indication of the scale of this market. In 2003 the state-based CSE agency contracted out 886 paternity testing cases to LabCorp (OCSE, New Mexico, personal communication), amounting to 0.5 cases per 1000 population: double the number of cases per capita in Australia, but still well below the number of cases per capita for the US. Given that New Mexico is a relatively poor state, it is unlikely that the number of cases per capita for the state would be lower than for the US as a whole. The implication is that many paternity tests in the context of nonmarital births occur in other contexts; through other arms of government, or through private avenues. There is no available data to clarify this point. Whatever the case, it remains true that the government market is a substantial one in the US, accounting for many more paternity tests per capita than the entire Australian market.

In Australia governments are also major players in the DNA paternity testing industry. The Child Support Agency (CSA) is responsible for making assessments of child support liability and enforcing them. An application for child support assessment is a condition of government child support (the Parenting Payment). As one respondent – the manager of Genetic Technologies, the largest DNA paternity testing business in Australia - observed:

The tests we do for Legal Aid [an important agency in the Australian context] are mostly for mothers trying to force the father to admit he is the father so they can garnish his wage for child support.

The biggest single buyer of DNA paternity tests in Australia is Queensland Legal Aid, which tenders out its testing. Other state-based Legal Aid agencies are also significant buyers of DNA paternity tests, although they do not put them to tender.

Yet governments are much smaller players in the Australian industry than in the US. Unlike the Office of Child Support Enforcement in the US, the Child Support Agency in Australia does not have the authority to order a DNA paternity test. Nor is it a major contractor in the industry. In the event of disputed paternity, the CSA refers applicants to the legal system and, in the event that they are unable to bear the costs of a court case or a paternity case, to Legal Aid. There are
no reliable statistics for the number of cases facilitated through Legal Aid, but estimates from senior personnel around Australia suggest no more than 1200 per annum. Personnel agreed that Queensland Legal Aid facilitated more tests than any other state, but even here there were only an estimated 400 cases per annum. Queensland has a population of almost 4 million, more than double that of New Mexico, yet its government agencies facilitate less than half as many paternity tests.

The fact that government agencies in Australia are smaller players in the industry means that the Australian market is less segmented than that in the US. Many CSA applicants make arrangements for paternity testing through private avenues, including doctors and lawyers. Only Queensland Legal Aid tenders out its tests to the one company. Legal Aid encourages tests through negotiation rather than enforcement, promoting different pathways to the tests and different providers. One senior Legal Aid official observed:

> if the other party writes back saying yes, I agree to do the test ... we would then just contact [Genetic Technologies] or one of the other labs, and we would make the appointment ... and it would be non-litigious.

For his part, the manager of Genetic Technologies observed that ‘less than 30 percent’ of their tests were for Legal Aid. More generally, laboratory managers did not make a sharp distinction between the government and private markets. Unlike the US, the two markets ‘blurred’ together, with many government-driven tests occurring through private avenues.

Most likely, US government agencies enforce relatively more paternity tests at least partly because of different legislative frameworks; that is, the presumption of paternity is more narrowly defined in the US than Australia, triggering more tests. Certainly the legal framework is more straightforward in Australia, where federal law – that is, the *Child Support Assessment Act 1989* – prevails. In the US different states follow different rules, but the *Uniform Parentage Act 1973* (amended in 2000 and then again in 2002), applied fully in 19 states stretching from Delaware to California (including New Mexico), and partially in others. In most respects the same presumptions of paternity apply; for example, if a man is married to the child’s natural mother, or was married at the time of the child’s birth or thereabouts. In one respect there is a notable difference. In the US there is some provision for children born in de facto relationships, but it depends upon voluntary acknowledgement of paternity (National Conference of Commissioners on Uniform State Laws 2002). In Australia, on the other hand, there is a presumption of paternity where ‘the father lived with the mother at any time during the period 44 to 20 weeks before the birth of the child’ (Australian Government 2004). As a senior Legal Aid official in Australia observed:

> For us, even if parties were residing together for one month ... during the conception period and pregnancy period, then they could fall under a presumption. We have quite a wide presumption of paternity ... [I]n many situations the agency can just accept it ... without any signed acknowledgement and without DNA testing. And then if the alleged father doesn’t dispute it, it’s just accepted (Legal Aid official, Australia).

Briefly, governments in both the US and Australia employ DNA paternity testing in order to enforce the obligations of biological paternity. Yet their enforcement of this policy varies considerably. Government agencies in the US are much more actively involved in the industry, both in terms of ordering the tests and paying for them. This is at least partly on account of differences in legal frameworks in relation to the presumption of paternity. By implication, government is responsible – to some extent at least - for the difference in the scale of DNA paternity testing between the US and Australia. Yet this finding begs the question as to whether US government agencies have more cause to enforce the obligations of biological paternity than those in Australia. To explore this suggestion we need to consider differences in family structure between the two countries.
Family structure
The third hypothesis for consideration is that the difference in the scale of DNA paternity testing between the US and Australia is due to the fact that more American than Australian women give birth in circumstances where there is uncertainty about biological paternity. The most obvious line of inquiry in this respect is births outside of marriage. After all, government agencies – major industry players in both countries, but especially in the US – only demand the tests in relation to nonmarital births, where there is no presumption of paternity by law.

Consider first the number of unmarried births as a percentage of all births. In 1960 about 5 percent of births were nonmarital in both countries (5.3 percent in the US, 5.1 percent in Australia). It thereafter rose rapidly, more so in the US than Australia. In 1983 20.3 percent of all births in the US were out of wedlock, compared with 14.7 percent in Australia. The percentage of nonmarital births then rose in both countries, but the difference between them narrowed. In 2003, 34.6 percent of all births in the US were nonmarital, compared with 31.7 percent in Australia (de Vaus 2005:37; Sutton and Mathews 2004:2; ABS 2003:43-4; Weston et al 2001:17). These differences go a small way in explaining the greater enforcement of DNA paternity testing by US government agencies compared with those in Australia.

The overall fertility rates in the two countries also go some way in explaining the differences. In 1955-60 the fertility rate in the US was 3.7; that is, women of reproductive age were having an average of 3.7 offspring. In Australia in 1955-60 the fertility rate was 3.4. Over the next quarter century fertility rates declined in both countries. By 1985 the fertility rates were not much different, below replacement in both countries: 1.89 in Australia and 1.84 in the US. Thereafter the fertility rate rose and then stabilised in the US (2.09 in 1990, 2.10 in 2003), while in Australia it stabilised and then gradually fell (1.91 in 1990, 1.71 in 2003) (de Vaus and Wolcott 1997:48; de Vaus 2004:186). By implication, there are not just more unmarried births as a percentage of all births in the US; there are more unmarried births in relation to the population of women of reproductive age.

The fertility rate in the US is unusually high by Western standards. Demographers explain the high fertility rate in terms of two key dynamics. These dynamics also contribute to differences in unmarried births and paternity testing. First, Hispanic women have driven higher fertility rates in the US since the 1980s. In 2003 the fertility rate of Hispanic women was above replacement level; the fertility rate of black women was about replacement level; and the fertility rate of non-Hispanic white women was below replacement level. In the same year, nonmarital births as a percentage of all births amounted to 45.5 percent for Hispanic women, 68.5 percent for black women, and 23.5 percent for non-Hispanic white women (Sutton and Mathews 2004:2,5). The pattern here was not a straightforward one. Most obviously, black women were more likely than Hispanic women to have nonmarital births, but their fertility rate was lower. At the same time, the group least likely to have births outside of marriage – non-Hispanic white women – were also least likely to have births at all; while Hispanic women, who drove the rising fertility rate, also had a relatively high nonmarital birth rate, well above the rate for the whole of the US.

Second, as one US government report observed, the US ‘does lead other industrialized countries in the rate of teen childbearing: even in countries with higher proportions of nonmarital births than in the United States, proportions of teen births are much lower’ (DHHS 1995:67). Teenage childbearing in the US is partly responsible for its high fertility rates. It also informs the number of nonmarital births in relation to all births. In 1998, for example, the teenage birth rate (number of births per 1000 women aged 15-19) in the US was 51.1, compared with 18.1 in Australia (de Vaus 2004:200). In the same year 30 percent of all nonmarital births for women in the US were to teenagers, compared with 15 percent of nonmarital births for Australian women (Ventura and Bachrach 2000:18; ABS 2003:44).
The fact that American women are more likely than Australian women to have births outside of marriage does not in itself imply more welfare dependence. In the event that an unmarried mother lives in a cohabiting (or de facto) relationship with the father of her child, she does not require sole parent support. Similarly, in the event that the father acknowledges biological paternity and undertakes responsibility for the child, then sole parent support is not required. Indeed, the rates of cohabitation and paternity acknowledgement have increased substantially in the US since the 1980s (DHHS 1995:234; Ventura and Bachrach 2000:8). By implication, the rising scale of nonmarital births has not translated automatically into welfare dependence on the same scale.

The data on cohabitation and paternity acknowledgement for the US and Australia is not directly comparable, and it is often incomplete and patchy. Even so, it seems clear that Australian fathers are more likely to live in cohabiting relationships with unmarried mothers. In close connection, they are also more likely to acknowledge biological paternity to the relevant child support agency, given that they live in an ongoing relationship with the mother. In 1990, 39 percent of nonmarital births in the US were to cohabiting couples (Ventura and Bachrach 2000:8); and in the mid 1990s experts estimated that between one-third and one-half of American non-marital fathers acknowledged paternity (Mclanahan and Sandefur 1994:148; DHHS 1995:235,255). In contrast, 64 percent of Australian nonmarital fathers acknowledged paternity in 1983, rising to 82 percent in 1993 and 88 percent in 2003 (ABS 2003:10,34); and in 2001 about 54 percent of all nonmarital births in Australia were to cohabiting couples (de Vaus 2004:202). By implication, Australian men were significantly more likely to undertake support for nonmarital children; hence (at least partly) differences in the enforcement of DNA paternity testing by government agencies between the two countries, and differences in the use of DNA paternity testing generally.

Briefly, differences in family structure – and more specifically fatherhood – go a substantial way in explaining why there are so many DNA paternity tests in the US compared with Australia. It is another thing again to explain these differences in family structure. These differences lie beyond the scope of this paper, but there is no doubt that class and ethnic dynamics are important. By implication, class and ethnic dynamics explain some of the difference in the scale of paternity testing between the two countries.

The industry

A final hypothesis for the difference in the scale of DNA paternity testing between the US and Australia focuses upon the industry itself. In the US the industry is characterised by widespread use of brokers, who seek out private (non-government) business for the laboratories. Moreover, US laboratories and brokers more actively promote paternity tests, most famously through billboards on freeways asking motorists, ‘Who’s your daddy?’ Following the logic of this hypothesis, perhaps there are more DNA paternity tests in the US than Australia for the simple reason that they are more actively promoted.

In fact, laboratory managers in both the US and Australia agree that the majority of tests are ultimately grounded in births out of wedlock; or more specifically, in unmarried women wanting to secure child support. The demand for these tests is relatively inelastic. It depends, as discussed, upon patterns of family formation and government regulation. Yet there is also a private market that is grounded in marital births. More specifically, the clients include alienated or suspicious husbands; or perhaps the new wives or de factos of such men, or their parents. These customers want to establish whether they are in fact the biological fathers of their supposed offspring. They do not necessarily want their wives or former wives to know that they are undertaking the tests. In both countries, laboratory managers consistently described these customers as accounting for 20 to 30 percent of all tests.

Whereas the demand for paternity tests grounded in nonmarital births is relatively inelastic, the market for tests grounded in marital births is not. Entrepreneurs and managers have much
more scope for taking active measures to expand this market. In both countries they have developed a distinctive product for this market: known, especially in the US, as ‘peace of mind’ tests. These tests are also sometimes described in various contexts as ‘motherless tests’, because they do not require samples from the mother, and ‘non-consensual tests’, because they do not require the knowledge or consent of the mother. The tests are currently legal in both countries, but they do not have legal status in a court of law. Not surprisingly, such tests are the most controversial and high-profile aspect of the industry. In Australia a recent government-commissioned inquiry recommended the prohibition of such tests (ALRC/AHEC 2002; Gilding 2004:72-5). In the US, respondents described how the tests precipitated a bitter conflict between the American Association of Blood Banks and one of its member companies, which successfully defied an injunction not to provide them.

This market is a significant one in both Australia and the US. Yet the market among alienated fathers exercises more influence in the US than Australia. This is at least partly on account of industry structure. The Australian industry is overwhelmingly organised through laboratories, whose customers are mainly lawyers and doctors. In this context, tests grounded in nonmarital births are relatively evenly spread among Australian providers. In contrast, government agencies in the US drive the majority of tests, tendering most of them to two big companies. This leaves forty or so other laboratories to compete for what is left over. In turn, the US industry is heavily grounded in brokerage, whereby laboratories specialise in testing, and brokers specialise in marketing. There are at least as many brokers (or as they are sometimes called, ‘distributors’ or ‘re-sellers’) as there are laboratories in the US. Nearly all of the US laboratory managers interviewed for this study described how a significant part of their custom came through brokers. For example:

Our lab doesn’t really deal with the general public, and the contract clients are more your brokers, your middle man, who will have their

website listed as AABB accredited, but they don’t do anything with the samples. They just send it all to us (Lab Owner, US).

In this context, US brokers and laboratories were much more aggressive in their promotion of DNA paternity tests to the general public. Only one Australian laboratory actively promoted its tests through the Internet. In contrast, Internet promotion was ubiquitous among US brokers and laboratories. Promoters created multiple websites; they devised strategies to make themselves prominent on search engines; and increasingly resorted to paid listings. One lab manager, for example, described how Google – the ‘800 pound gorilla when it comes to search engines’ – changed its algorithms, so that ‘one day we dropped off the free listings’ and ‘our business just went down to zero’. The business took out several paid listings (for roughly US$16,000 a month) and hired a Search Engine Optimization company to improve its profile in the free listings. The problem, he acknowledged, was that the market was ‘relatively saturated’, so that a lot of other labs and brokers were using the same strategies.

US brokers and laboratories also made more extensive use of the established media. In the late 1990s Identigene, a Texas laboratory, posted their notorious billboards on the freeway system, generating a wave of media coverage. Laboratories and brokers were also active on daytime television. In particular, shows such as Ricki Lake, Jerry Springer, Maurie, Judge Hatchett and Home Delivery showed that paternity testing was an ‘elixir to raise TV ratings’ (Stanley 2002). One business manager described how his laboratory has created a ‘reputation for working with shows on paternity testing’, and has worked with ‘about 15 to 20’ production teams to date. The lab ensures that tests are ‘accurate and authentic’ and provides them at ‘trade prices, rather than profit’, in exchange for on-show promotion. It was once possible to identify ‘spikes’ in demand arising from such shows, but their ubiquity now means that the spikes are less obvious. Day-time television, he claims, is ‘the major reason’ for a growing market in private tests during recent years.
Industry differences offer a significant reason for why there are so many DNA paternity tests in the US compared with Australia. The US industry is structured in a way that means more active marketing to the general public. Moreover it is relatively unrestrained in its efforts to build the market. It promotes insecurity around paternity in the same way as other businesses promote insecurity around personal appearance in order to sell toothpaste (for whiter teeth) or shampoo (for beautiful hair). Insecurity around paternity implies distrust, and a 'peace of mind' test promises a resolution of these concerns.

Conclusion
The relatively low number of DNA paternity tests per capita in Australia compared with the US does not occur because of 'technological lag'. If anything, Australian companies adopted DNA technology more rapidly than those in the US. Rather, an answer can be found in a combination of political, cultural and economic factors.

First, the difference arises as a result of the role of government agencies. Governments in both countries insist upon DNA paternity testing in the context of nonmarital births in order to enforce the obligations of biological paternity, but US agencies enforce relatively more tests than those in Australia. This is at least partly because the presumption of paternity is more narrowly defined in the US.

Second, the difference arises as a consequence of family structure. In the US both the fertility rate and the proportion of nonmarital births are higher. Moreover, nonmarital births in the US are less likely to occur in the context of informal cohabitation, where the father is more likely to acknowledge paternity. Differences in family structure mean that US government agencies are more commonly required to enforce DNA paternity testing.

Third, the difference arises on account of industry organisation. In the US the industry is characteristically divided between those who provide tests for child support agencies, and those who provide tests for private clients, notably men with concerns about marital births. In turn, there is more reliance upon brokers to seek out business, and more active marketing through the Internet, day-time television and other media. Differences in industry organisation fuel more private (non-government) demand in the US than Australia.

Comparative data on paternity testing demonstrates that new genetic testing technologies are mediated by social dynamics. As genetic testing becomes more widely applied in medical and non-medical contexts, we can expect that social dynamics will generate significant variations in the uptake of tests between different countries.

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Endnotes
1 The terms 'paternity test' and 'case' are sometimes used interchangeably. In fact, one paternity case by definition always involves more than one test; a minimum of two (the child and putative father), and often three (usually the mother, father and child). The tests are then compared in order to establish biological paternity. If there is a relative difference in the number of paternity cases, it follows that there will be roughly the same difference in the number of paternity tests. The term 'paternity case' is strictly speaking more accurate, but it is less familiar than 'paternity test'. For this reason, I often use the term 'paternity test' in this article, unless I want to be especially clear that I am talking about the number of cases.

2 The Australian figure is an estimate, based on interviews with industry informants (Gilding 2004:70). If anything, it is an over-estimate. The Texas figure is also an estimate, based upon extrapolations from US data and industry informants. The US figure is based upon the annual American Association of Blood Banks
survey (AABB 2004). The survey includes some overseas laboratories and the overseas clients of US laboratories. By the same token, it does not include all US laboratories, especially the non-accredited ones.

3 The AABB survey includes several non-US laboratories. These are small laboratories and do not make a significant difference to the overall results of the survey.

References


**ANNOUNCING – August 2007**

**Social Equity and Health**
ISBN 0-9757422-8-0
Guest Edited by Olle Lundberg, Karolinska Institute, Stockholm
A special issue of Health Sociology Review

With the launch of the WHO Commission on Social Determinants of Health, ‘charged with recommending interventions and policies to improve health and narrow health inequalities through action on social determinants’, these issues are put to the forefront of global health policy making. We invite papers addressing any aspect of this broad area, covering substantive but also methodological issues of importance, closely linked to core issues in sociology, such as the interplay between social structures, individual and group-level actions and individual outcomes.

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